

**IN THE CLAIMS:**

1. A method for controlling a melt temperature of a crystal-growing apparatus comprising the steps of:
  - determining a crystal diameter of a crystal being grown by the crystal-growing apparatus;
  - 5 comparing the determined crystal diameter with a predetermined crystal diameter to determine a discrepancy value;
  - correlating the discrepancy value with the following parameters: a direction that the melt temperature must be adjusted and an amount the melt
  - 10 temperature needs to be adjusted;
  - transmitting the parameters to a pulse generator for using the parameters to generate pulses having a polarity which indicates whether the melt temperature is to be increased or decreased and also having a magnitude which indicates the amount of increase or decrease; and
  - 15 transmitting the generated pulses to at least one input terminal of a temperature controller for increasing or decreasing the melt temperature of the crystal-growing apparatus according to the polarity and magnitude of the pulses.
- 20 2. The method according to Claim 1, wherein the method controls the melt temperature independently of the melt temperature as determined by a bottom heater of the crystal-growing apparatus.
3. The method according to Claim 1, further comprising the steps
- 25 of:
  - determining a melt level of the crystal-growing apparatus; and
  - using the determined melt level to determine the crystal diameter of the crystal being grown by the crystal-growing apparatus.

4. The method according to Claim 1, further comprising the steps of:
- receiving a temperature adjustment signal from a bottom heater thermocouple of the crystal-growing apparatus which indicates the melt temperature; and
- determining whether to increase, decrease or keep constant the melt temperature based on the melt temperature as indicated by the temperature adjustment signal.
5. The method according to Claim 1, further comprising the step of manually increasing/decreasing the melt temperature.
6. The method according to Claim 1, wherein the step of correlating the discrepancy value includes the step of accessing a data structure stored in a memory.
7. A system for controlling a melt temperature of a crystal-growing apparatus, said system comprising:
- means for determining a crystal diameter of a crystal being grown by the crystal-growing apparatus;
- means for comparing the determined crystal diameter with a predetermined crystal diameter to determine a discrepancy value;
- means for correlating the discrepancy value with the following parameters: a direction that the melt temperature must be adjusted and an amount the melt temperature needs to be adjusted;
- means for transmitting the parameters to a pulse generator for using the parameters to generate pulses having a polarity which indicates whether the melt temperature is to be increased or decreased and also having a magnitude which indicates the amount of increase or decrease; and
- means for transmitting the generated pulses to at least one input terminal of a temperature controller for increasing or decreasing the melt

temperature of the crystal-growing apparatus according to the polarity and magnitude of the pulses.

8. The system according to Claim 7, wherein the apparatus  
5 controls the melt temperature independently of the melt temperature as determined by a bottom heater of the crystal-growing apparatus.

9. The system according to Claim 7, further comprising means for determining a melt level of the crystal-growing apparatus for use by the  
10 means for determining the crystal diameter of the crystal being grown by the crystal-growing apparatus.

10. The system according to Claim 7, further comprising:  
means for receiving a temperature adjustment signal from a bottom  
15 heater thermocouple of the crystal-growing apparatus which indicates the melt temperature; and  
means for determining whether to increase, decrease or keep constant the melt temperature based on the melt temperature as indicated by the temperature adjustment signal.

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11. The system according to Claim 7, further comprising means for manually increasing/decreasing the melt temperature.

12. The system according to Claim 7, wherein the means for  
25 correlating the discrepancy value includes means for accessing a data structure stored in a memory.

13. A process control system for controlling a melt temperature of a crystal-growing apparatus, said process control system comprising:  
30 circuitry for determining a crystal diameter of a crystal being grown by the crystal-growing apparatus, for comparing the determined crystal diameter with a predetermined crystal diameter to determine a discrepancy value, and

for correlating the discrepancy value with the following parameters: a direction that the melt temperature must be adjusted and an amount the melt temperature needs to be adjusted;

5 a pulse generator for receiving the parameters and for generating pulses having a polarity which indicates whether the melt temperature is to be increased or decreased and also having a magnitude which indicates the amount of increase or decrease; and

a temperature controller having at least one input terminal for receiving the generated pulses and for increasing or decreasing the melt temperature  
10 of the crystal-growing apparatus according to the polarity and magnitude of the pulses.

14. The process control system according to Claim 13, wherein the process control system controls the melt temperature independently of the melt temperature as determined by a bottom heater of the crystal-growing  
15 apparatus.

15. The process control system according to Claim 13, wherein the circuitry further determines a melt level of the crystal-growing apparatus for use in determining the crystal diameter of the crystal being grown by the  
20 crystal-growing apparatus.

16. The process control system according to Claim 13, wherein the temperature controller further comprises:

an input terminal for receiving a temperature adjustment signal from a  
25 bottom heater thermocouple of the crystal-growing apparatus which indicates the melt temperature; and

circuitry for determining whether to increase, decrease or keep constant the melt temperature based on the melt temperature as indicated by the temperature adjustment signal.

17. The process control system according to Claim 13, wherein the temperature controller further comprises at least one manually-operational switch for manually increasing/decreasing the melt temperature.
- 5 18. The process control system according to Claim 13, wherein the circuitry further accesses a data structure stored in a memory for correlating the discrepancy value.
- 10 19. A process control system for controlling a melt temperature of a crystal-growing apparatus, said process control system comprising:  
a pulse generator for generating pulses having a polarity which indicates whether the melt temperature is to be increased or decreased and also having a magnitude which indicates the amount of increase or decrease; and  
15 a temperature controller having at least one input terminal for receiving the generated pulses and for increasing or decreasing the melt temperature of the crystal-growing apparatus according to the polarity and magnitude of the pulses.
- 20 20. The process control system according to Claim 19, wherein the process control system controls the melt temperature independently of the melt temperature as determined by a bottom heater of the crystal-growing apparatus.